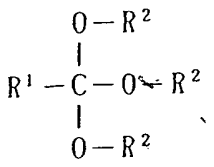
CLAIMS

1. A polyorthoester prepared by reacting:

(a) an orthoester represented by the following Formula (I):



(I)

wherein R^1 represents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, and three R^2's may be the same or different and each represent an alkyl group having 1 to 4 carbon atoms,

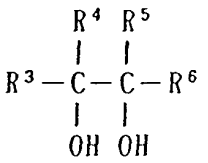
(b) at least one glycol compound selected from α-glycols and β-glycols, and

(c) a hydroxyl group-containing compound having at least two hydroxyl groups in a molecule other than the compound (b) described above.

2. The polyorthoester as described in claim 1, wherein the orthoester (a) is at least one compound selected from the group consisting of methyl orthoformate, ethyl orthoformate, propyl orthoformate, butyl orthoformate, methyl orthoacetate, ethyl orthoacetate, methyl orthopropionate, ethyl orthopropionate, methyl orthobutyrate and ethyl orthobutyrate.

3. The polyorthoester as described in claim 1, wherein the orthoester (a) is at least one compound selected from the group consisting of methyl orthoformate, ethyl orthoformate, methyl orthoacetate and ethyl orthoacetate.

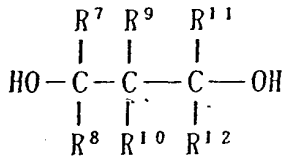
4. The polyorthoester as described in claim 1, wherein the glycol compound (b) is at least one glycol compound selected from the group consisting of an α-glycol represented by the following Formula (II):



(II)

wherein R^3, R^4, R^5 and R^6 may be the same or different and each represent a hydrogen atom, an alkyl group having 1 to 24 carbon atoms, an aralkyl group having 7 to 24 carbon atoms or a phenyl group, or a group obtained by substituting a part of these groups with an oxygen atom, and the total of the carbon atoms in the groups represented by R^3, R^4, R^5 and R^6 falls in a range of 0 to 24; and R^4 and R^5 may form a cyclic structure together with carbon atoms to which they are bonded directly and

a β-glycol represented by the following Formula (III):



(III)

wherein R^7, R^8, R^9, R^{10}, R^{11} and R^{12} may be the same or different and each represent a hydrogen atom, an alkyl group having 1 to 24 carbon atoms, an aralkyl group having 7 to 24 carbon atoms or a phenyl group, or a group obtained by substituting a part of these groups with an oxygen atom, and the total of the carbon atoms in the groups represented by R^7, R^8, R^9, R^{10}, R^{11} and R^{12} falls in a range of 0 to 24; and R^7 and R^9 or R^7, R^9 and R^{11} may form a cyclic structure together with carbon atoms to which they are bonded directly.

5. The polyorthoester as described in claim 4, wherein the α-glycol is selected from the group consisting of ethylene glycol, 1,2-propylene glycol, 1,2-butylene glycol, 2,3-butylene glycol, 1,2-hexanediol, 1,2-dihydroxycyclohexane, pinacol, hydrolysis products of long chain alkyl monoepoxides, glycerin monoacetate (α product), glycerin monostearate (α product), 3-ethoxypropane-1,2-diol and 3-phenoxypropane-1,2-diol.

6. The polyorthoester as described in claim 4, wherein the β-glycol is selected from the group consisting of neopentyl glycol, 2-methyl-1,3-propanediol, 2-methyl-2,4-pentanediol, 3-methyl-1,3-butanediol, 2-ethyl-1,3-hexanediol, 2,2-diethyl-1,3-propanediol, 2,2,4-trimethyl-1,3-pentanediol, 2-butyl-2-ethyl-1,3-propanediol, 2-phenoxypropane-1,3-diol, 2-methyl-2-phenylpropane-1,3-diol, 1,3-propylene glycol, 1,3-butylene glycol, dimethylolpropionic acid, dimethylolbutanoic acid, 2-ethyl-1,3-octanediol, 1,3-dihydroxycyclohexane, glycerin monoacetate (β product) and glycerin monostearate (β product).

7. The polyorthoester as described in claim 1, wherein the glycol compound (b) is at least one compound selected from the group consisting of ethylene glycol, 1,2-propylene glycol, 1,2-hexanediol, neopentyl glycol, 2-methyl-1,3-propanediol, 2-methyl-2,4-pentanediol, 3-methyl-1,3-butanediol, 2-ethyl-1,3-hexanediol, 2,2-diethyl-1,3-propanediol, 2,2,4-trimethyl-1,3-pentanediol and 2-butyl-2-ethyl-1,3-propanediol.

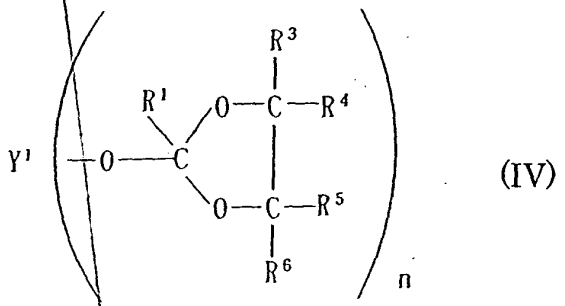
8. The polyorthoester as described in claim 1, wherein the hydroxyl group-containing compound (c) is at least one compound selected from the group consisting of 1,4-butanediol, 1,4-dihydroxycyclohexane, 1,5-pentanediol, 1,6-hexanediol, 2,5-hexanediol, 3-methyl-1,5-pentanediol, 1,4-dimethylolcyclohexane, tricyclodecanedimethanol, 2,2-dimethyl-3-hydroxypropyl-2,2-dimethyl-3-hydroxypropionate, bisphenol A, bisphenol F, bis(4-hydroxyhexyl)-2,2-propane, bis(4-hydroxyhexyl)methane, 3,9-bis(1,1-dimethyl-2-hydroxyethyl)-2,4,8,10-tetraoxaspiro[5,5]undecane, diethylene glycol, triethylene glycol, tetra- or more polyethylene glycol, dipropylene glycol, tripropylene glycol, tetra- or more polypropylene glycol, copolymers having hydroxyl groups at both terminals obtained by copolymerizing ethylene oxide with propylene oxide, polycaprolactonediol, polycarbonatediol, carboxylic acid adducts of diepoxide, glycerin, diglycerin, triglycerin, pentaerythritol, dipentaerythritol, sorbitol, mannit, trimethylolethane,

trimethylolpropane, ditrimethylolpropane, tris(2-hydroxyethyl)isocyanurate, gluconic acid and polymers having 3 or more hydroxyl groups.

9. The polyorthoester as described in claim 1, wherein the hydroxyl group-containing compound (c) has a molecular weight falling in a range of 90 to 100,000 and a hydroxyl group value falling in a range of 20 to 1,850 mg KOH/g.

10. The polyorthoester as described in claim 1, wherein a hydroxyl group contained in the hydroxyl group-containing compound (c) is blocked by an orthoester of a 5-membered ring or a 6-membered ring constituted by the orthoester (a) and the glycol compound (b).

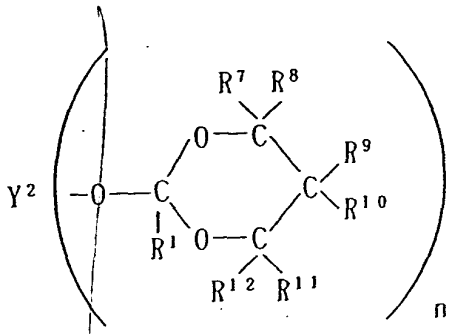
11. The polyorthoester as described in claim 1, having a structure represented by the following Formula (IV):



(IV)

wherein Y^1 represents a di- to hexavalent residue obtained by removing the following 2 to 6 hydroxyl groups from a compound having 2 to 6 hydroxyl groups in a molecule; R^1, R^3, R^4, R^5 and R^6 are the same as defined in claims 1 and 4; and n represents an integer of 2 to 6, or

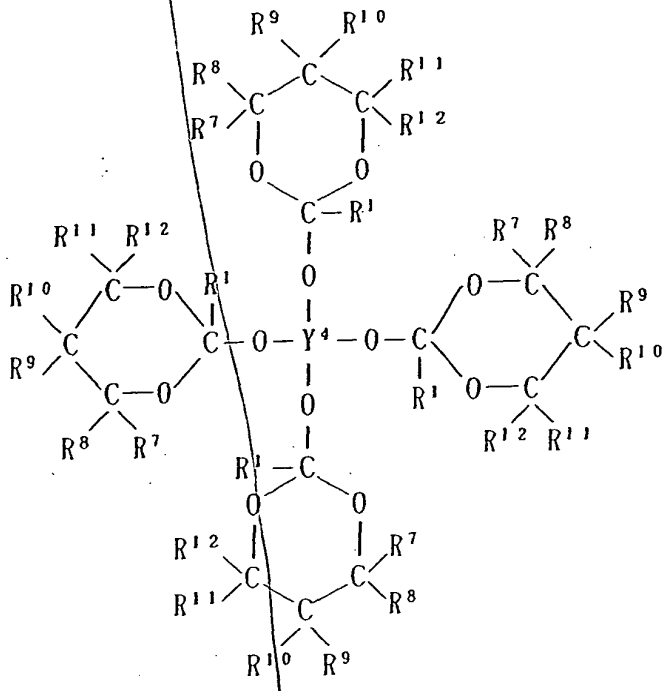
the following Formula (V):



(V)

wherein Y^2 represents a di- to hexavalent residue obtained by removing the following 2 to 6 hydroxyl groups from a compound having 2 to 6 hydroxyl groups in a molecule; R^1, R^7, R^8, R^9, R^{10}, R^{11} and R^{12} are the same as defined in claims 1 and 4; and n represents an integer of 2 to 6.

12. The polyorthoester as described in claim 1, having a structure represented by the following Formula (VII):



(VII)

wherein Y^4 represents a residue obtained by removing the following four hydroxyl groups from a compound having four hydroxyl groups in a molecule; and R^1, R^7, R^8, R^9, R^{10}, R^{11} and R^{12} are the same as defined in claims 1 and 4.

13. A production process for a polyorthoester characterized by subjecting the orthoester (a), the glycol compound (b) and the hydroxyl group-containing compound (c) each described in claim 1 to condensation reaction in the presence of an acid catalyst.

14. The process as described in claim 13, wherein the orthoester (a) in a proportion falling in a range of 0.05 to 5 moles is reacted with the glycol compound (b) in a proportion falling in a range of 0.05 to 5 moles each per equivalent of a hydroxyl group contained in the hydroxyl group-containing compound (c).

15. A curable composition comprising:

(A) the polyorthoester as described in claim 1, and

(B) a curing agent having a group having a reactivity with a hydroxyl group.

16. The curable composition as described in claim 15, wherein the curing agent (B) is at least one compound or resin selected from the group consisting of polyisocyanate compounds, amino resins, epoxy group-containing compounds, alkoxysilyl group-containing compounds and compounds having two or more carboxylic anhydride groups.

17. The curable composition as described in claim 15, wherein the curing agent (B) is at least one compound or resin selected from the group consisting of polyisocyanate compounds and amino resins.

18. The curable composition as described in claim 15, comprising the polyorthoester (A) and the curing agent (B) in a range of 95/5 to 20/80 in terms of a solid matter weight ratio of (A)/(B).

19. The curable composition as described in claim 15, further comprising an acid catalyst.

20. The curable composition as described in claim 19, wherein

the acid catalyst is at least one compound selected from the group consisting of sulfonic acid compounds, neutralized compounds of the sulfonic acid compounds, organic phosphoric acid base compounds and neutralized compounds of the organic phosphoric acid base compounds.

21. The curable composition as described in claim 15, assuming the form of a coating material composition, an adhesive or an ink.

22. A curable composition comprising:

(1) a base polymer having a reactivity with the following curing agent (2),

(2) a curing agent which has a group having a reactivity with a hydroxyl group and which has a reactivity with the base polymer (1), and

(3) the polyorthoester as described in claim 1.

23. The curable composition as described in claim 22, wherein the base polymer (1) is a hydroxyl group-containing polymer having a hydroxyl group value falling in a range of 20 to 300 mg KOH/g and a number average molecular weight falling in a range of 1,000 to 30,000.

24. The curable composition as described in claim 22, wherein the base polymer (1) is at least one polymer selected from the group consisting of hydroxyl group-containing acrylic resins and hydroxyl group-containing polyester resins.

25. The curable composition as described in claim 22, wherein the curing agent (2) is at least one compound selected from the group consisting of polyisocyanate compounds, amino resins, epoxy group-containing compounds, alkoxysilyl group-containing compounds and compounds having two or more carboxylic anhydride groups.

26. The curable composition as described in claim 22, wherein the curing agent (2) is at least one compound or resin selected from the group consisting of polyisocyanate compounds and amino resins.

27. The curable composition as described in claim 22, comprising the base polymer (1), the curing agent (2) and the polyorthoester (3) in a range of 20 to 89 parts by weight of the component (1), 5 to 70 parts by weight of the component (2) and 1 to 40 parts by weight of the component (3) based on 100 parts by weight of the total of solid matters contained in the respective components (1), (2) and (3).

28. The curable composition as described in claim 22, further comprising an acid catalyst.

29. The curable composition as described in claim 28, wherein the acid catalyst is at least one compound selected from the group consisting of sulfonic acid compounds, neutralized compounds of the sulfonic acid compounds, organic phosphoric acid base compounds and neutralized compounds of the organic phosphoric acid base compounds.

30. The curable composition as described in claim 22, assuming the form of a coating material composition, an adhesive or an ink.